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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



"Man, What a Ride"

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## ASTRONAUTICS

# Air-Breathing Space Engine

► THE KIND of engine used in automobiles, airplanes (except jets) and lawnmowers can be developed by 1968 to reach speeds fast enough for orbital flight around the earth, or 25,000 feet per second.

Dr. Theodore von Karman, aerospace pioneer who was in Washington, D. C., to celebrate his 80th birthday, predicted at a news conference that the fuel used for an air-breathing engine at this speed would be liquid hydrogen.

A booster vehicle powered with such an engine would be able to soar around the earth, launch satellites and space vehicles into deep space and then return to earth, ready for another trip.

Today's booster rocket, which usually separates from the satellite at the time of orbit, is wasted and a primitive solution, he said. Booster vehicles that can be recovered would cut costs of space flight considerably.

Dr. von Karman, chairman of the Advisory Group for Aeronautical Research and Development of the North Atlantic Treaty Organization (NATO) and director of International Academy of Astronautics, is one of the world's leading authorities in aerospace science.

The recent United States success in sub-

orbital space flight of astronaut Alan B. Shepard was hailed by Dr. von Karman as proof that the essential problems of space flight have been solved by the United States.

Dr. von Karman predicted that the U. S. would close the missile gap with Russia in three to five years. The U. S. will then have developed missiles and satellites matching Russian missiles in performance.

He urged that the U. S. develop large boosters as well as nuclear rockets for possible flights to the moon.

Dr. von Karman said he does not believe in complete automation. Although the automaton can do the easy part of the flight, the part requiring decisions will always need a man.

Directors of U. S. scientific institutions should be scientists, not administrators with a scientific assistant as is now generally the case, Dr. von Karman believes.

His success in the U. S., Dr. von Karman said, stems from the fact that he had a good secondary school education in his native Hungary, and also from the very liberal atmosphere in the U. S., where scientific work is highly esteemed.

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## METEOROLOGY

## Completely Automatic Weather Forecasting

► A COMPLETELY automatic weather forecasting system will definitely become a reality in the near future.

A network of unmanned automatic weather stations scattered across the country will soon be transmitting data into a central computer at the U. S. Weather Bureau's National Meteorological Center in Suitland, Md. The IBM 7090 computer will process the information, then print out weather forecasts for the entire country.

An important step toward this goal will be taken in the next few weeks when the first AMOS IV, a specialized computer that automatically records and stores weather information, is installed at the Worcester Airport, Worcester, Mass.

The present weather observation system is a mixture of meteorologists, weather instruments, volunteer weather observers, and automatic weather observing stations. Twenty-four AMOS III instruments, earlier versions in the Amos series of automatic weather stations, are already proving valuable in helping weather forecasters.

"Within the next two years, all data coming into the Weather Bureau's Meteorological Center from the manned and automatic weather stations will be automatically processed by the 7090 computer for issuing weather forecasts," Frank W. Burnett, assistant director for weather analysis and forecasting, reported.

It is only a question of time before the entire process from the gathering of weather data throughout the country to the final weather forecast will become completely automatic, he emphasized.

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## AEROMEDICINE

# Astronauts to Hibernate

► SCIENTISTS are now trying to find a way to make men hibernate so they can withstand the acceleration stresses encountered in reaching speeds in space of millions of miles an hour.

Dr. Bernard Black-Schaffer of the University of Cincinnati College of Medicine reported to the American Association of Pathologists and Bacteriologists in Chicago that animals, and eventually man, can tolerate acceleration stresses more easily if they are immersed in fluid-filled bags. To keep them from drowning, he cools the animals to a state of suspended animation in which no breathing is required.

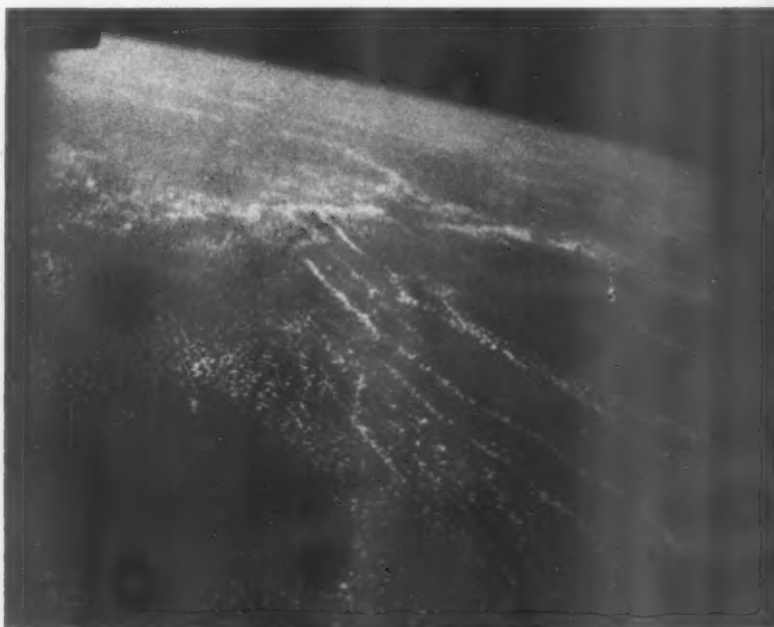
Working under a grant from the National Aeronautics and Space Administration, the agency charged with putting a man in orbit, Dr. Black-Schaffer found that natural hibernators, such as hamsters, can tolerate the effects of acceleration while in the cooled state much more easily than non-hibernators, such as rats. The rats, he said, digest their own stomachs and small intestines under these same conditions, and die of irreversible shock.

It is reasonably certain, the pathologist said, that the hamster's ability to bounce back to normal life results from its being better adapted to suspended animation because it is a natural hibernator.

If he can find a way to protect the rats, turn them into hibernators, the knowledge eventually can be applied to man, not only for survival in massive acceleration but also

in preventing the irreversible and fatal shock produced in man by severe injuries.

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WHAT A BEAUTIFUL VIEW—What astronaut saw from 100 miles up.

## ASTRONAUTICS

# U. S. Spaceman A-Okay

The United States broke the space barrier on May 5 when the first U. S. astronaut rode the Mercury capsule to an altitude of 115 miles for a suborbital, down-range flight.

## See Front Cover

► THE UNITED STATES broke the space barrier May 5 when Alan B. Shepard, Jr., 37-year-old astronaut, rode the Mercury capsule 302 miles down-range from Cape Canaveral, Fla.

At 9:34 a.m. EST the Redstone rocket carrying the Mercury capsule lifted off the launching pad and took the astronaut for a 15-minute trip that made him exclaim, "Man, what a ride!"

The astronaut reported flight data back to ground during the trip, but the verbal message A-Okay (meaning All-Okay) was the most wanted piece of information during the flight to the millions who tuned in on the flight.

In contrast to the hush-hush surrounding the orbital space flight of the Russian cosmonaut Yuri Gagarin on April 12, details of the scheduled U. S. suborbital flight was broadcast to all the world ahead of time as well as at the time of the flight.

The U.S.S.R. does not report failures in space program, but does claim credit for successes. Every missile or rocket failure as well as successes are publicized in the U. S.

Astronaut Shepard had some difficulty breathing and seeing as he went into space and back, but no more than he was prepared for. The stress on his body, including a "grayout" of his eyes, was less than he

had experienced in training in the centrifuge.

The worst time he had on the suborbital flight was after the flight itself. As he got out of the capsule to be picked up by the helicopter, he unplugged his pressure suit, and the resulting heat was worse than any discomfort during the trip.

He chose to be recovered by the helicopter rather than be lifted on board the rescue vessel in the capsule because this is the method that had been used in pre-flight recovery trials. His successful rescue is seen on the cover of this week's SCIENCE NEWS LETTER.

The astronaut said he believed no more suborbital flights would be necessary before a manned orbital shot. It had been announced earlier that several suborbital shots are planned.

At the time of launch Shepard was too busy for personal feelings, he said. When the Redstone rocket that carried his capsule 115 miles into space went off, he had also been surprised that the rocket went so smoothly and with so little noise.

During the trip, he did not see the moon or stars. He did see several landmarks in the Atlantic and on the Florida peninsula.

The astronaut reported it had been easy to work the controls during re-entry and while weightless, which he found a pleasant sensation. As he came back to earth, he experienced as much as 11 times

the gravity of earth, or felt 11 times his normal weight. Astronaut Shepard said the advances that can be expected from the flight are in the field of high temperature materials for re-entry vehicles.

The astronaut was given the National Aeronautics and Space Administration Distinguished Service Medal by President Kennedy at the White House on May 8.

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*check-up before space trip. Sensors, taped on his body, check breathing, temperature and heart beat.*



**AT 20,000 FEET**—Astronaut Alan B. Shepard Jr., is opening his helmet at 20,000 feet in order to get a better view on his way down from the first U. S. space jump.



**HELICOPTER RECOVERY**—Astronaut Shepard and his Mercury capsule arrive at U. S. Navy carrier.

## GENERAL SCIENCE

# Medical Fair Awards

Six young scientists won top medical awards at the 12th National Science Fair-International. The winners were chosen from 385 participants in the yearly event.

► **SIX BRIGHT YOUNG** high school students were given the top medical awards at the National Science Fair-International in Kansas City, Mo. The Science Fair was a competition, by scientific exhibits, of 385 young scientists who have won highest honors at local and regional fairs.

The two top awards of the American Medical Association were given to Rita Carol Manak, 16, of Lourdes Academy, Cleveland, Ohio, and Christopher George Cherniak, 16, of Melbourne High School, Melbourne, Fla. Carol won with her project on Intermediary Metabolism of Normal White Blood Cells, and Christopher was given the high honor for his project on the Development and Use of Tissue Culture of Functioning Single Neurons.

The two will be guests of the AMA at its annual meeting in New York in June.

The American Dental Association awards were won by Ann Elizabeth Stuart, 17, of Camp Hill High School, Camp Hill, Pa., for her project, Development of Lysozyme-Resistant Mutant, *Bacillus megaterium*, and Barbara E. Parker, 17, of St. Cyril High School, Detroit, Mich., for her exhibit on Effects of High Frequency Waves on Animal Tissue. Both young girls will attend the American Dental Association's annual meeting in Philadelphia next October.

The American Veterinary Medical Association has invited Charles Theodore Womack III, 17, of Greenwood High

School, Greenwood, Miss., to be a guest at its annual meeting in Detroit in August, as a top Science Fair winner for his project, The Effects of Splenic Extracts on Sarcoma in Two Animal Species.

Winner of the American Pharmaceutical Association's top award is Wayne Young, 17, of Provo High School, Provo, Utah, for his exhibit on Screening Mushrooms for Antibiotics. He will be the Association's guest at its annual convention in Las Vegas, Nev., next March.

The boys and girls attending the 12th National Science Fair-International were accompanied by some 1,000 teachers and educators and others, to determine the winners in various scientific fields. The Fair is administered by SCIENCE SERVICE.

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## EDUCATION

## Scientists Should Have Varied Education

► **TODAY'S** scientist needs a "smorgasbord" education, a generous sampling of many different disciplines.

Dr. Reidar F. Sognnaes, dean of the school of dentistry at the University of California Medical Center, Los Angeles, told high school students attending the health awards banquet for the National Science Fair-International in Kansas City, Mo., that

"we need and want specialists." But the different sciences are becoming more and more dependent upon each other and upon the non-scientific fields.

The person who does not have a working knowledge of fields other than his own will soon be obsolete, and the entire society, as well as the individual, suffers the loss.

Concepts are changing, Dr. Sognnaes said, and certainly formal education cannot teach the student everything he will need to know during his lifetime.

It should, however, give him the background on which to build.

The 12th National Science Fair-International was attended by some 380 boys and girls, accompanied by some 1,000 teachers and educators, to determine the winners of many honors in various scientific fields. It is administered by SCIENCE SERVICE.

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## GENETICS

# Chromosome in Evolution

► **THE PUZZLE** of just how man got to the top of the list in the animal world and just who his closest relatives were during the evolution of primates is slowly being unraveled by scientists comparing the similarities and differences of chromosomes found in each primate species.

Drs. E. H. Y. Chu and M. A. Bender of the Oak Ridge National Laboratory in Tennessee, have pieced together the information from separate studies. Changes in the sizes and shapes of primate chromosomes, microscopic strands of heredity-carrying units, occurred in a particular way, they believe.

Today's primates, from the lowest lemur to man himself, show a wide variety of chromosome numbers, but tests on animals representing the three major primate groups show that the same amount of chromosome material, deoxyribonucleic acid or DNA, is found in each.

The basic set of primate chromosomes, the investigators believe, is a relatively large number of chromosomes each much like a piece of string with a knot at one end

rather than in the middle or somewhere in between.

As time passed, some of the knots joined together, essentially making fewer separate strings, but longer ones, tied together in the middle. When short strings joined long strings, the knot of course was off center when the composite was stretched full length. More complex joinings probably also took place.

Different amounts of joining can be seen in different primate species now, the scientists report in Science, 133:1399, 1961, and the inference is that the more closely the joined strings of one species resemble those of another, the more closely the animals are related.

One pertinent fact is that when there are fewer primate chromosomes, there are also fewer strings with knots in the end.

The scientists also found one case of knotting together that occurred in man without any obvious change in his appearance.

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## MEDICINE

# Can Test Cancer Response

► **WHETHER A WOMAN** should have radiation treatment or surgery in the early stages of cancer of the cervix (neck of the uterus) can be decided by tests, the American Radium Society meeting in Colorado Springs, Colo., was told.

For a minority of patients the choice of initial treatment will be critical, although the majority of women will be cured with either surgical or radiation treatment in early stages of cervical cancer, Dr. S. B. Gusberg, College of Physicians and Surgeons, Columbia University, said.

To find which patients will respond best to radiation treatment, possibly helping to make it the best treatment for them, a small test dose of radiation is given. Biopsies, which are diagnostic examinations of a

piece of tissue removed from a living patient, are taken. Tissue sections and tissue smears are made from these biopsies and are stained for further studies of the cells, which are then tested for response to radiation.

About 70% of Dr. Gusberg's patients had an excellent response to radiosensitivity testing. Some had a moderate or mixed response and a very small proportion had a poor response.

If the tumor cells die or dissolve, if there is increased differentiation in the cells, or if reactions indicate the probability of permanent cell injury, responsive reaction to irradiation is indicated.

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## IMMUNOLOGY

# Immune to Yourself

► **YOU MAY BE** immune to yourself, but scientists do not yet know what to do about it.

Dr. Byron H. Waksman of Harvard Medical School and Massachusetts General Hospital, Boston, told the American College of Physicians meeting in Miami Beach, Fla., that medical men may be over-emphasizing "autoantibodies." The two different kinds of antibodies are, first, the well-known protective substances in the blood that prevent disease, and second, the autoantibodies in the cells that mean one is immune to himself.

Successful animal experiments in which the animals had been immunized to autoimmune diseases may in time provide a lead to understanding human unknowns such as multiple sclerosis and rheumatoid arthritis.

"The Wassermann antibody (syphilis) was the first 'autoantibody' ever described," Dr. Waksman said. "But no one has seri-

ously suggested that it could be responsible for the lesions of syphilis."

Whether autoantibodies cause or result from disease is not yet known, Dr. Waksman said. Some of them, as in syphilis, involve tissue destruction that is obviously responsible for stimulating antibody formation. But the simple demonstration of an autoimmunity to a disease of unknown origin tells nothing about its cause.

The children of mothers with active rheumatoid arthritis or multiple sclerosis are born free of these diseases, the microbiologist said. The suggestion that "autoantibodies" may have nothing to do with the mechanism of disease in such cases—systemic lupus erythematosus and rheumatoid arthritis, for example—means the patient has a gamma globulin anemia and cannot manufacture his own circulating antibody.

Dr. Waksman said limited attention has been paid to the possibility that in some

human diseases of unknown cause, "delayed" hypersensitivity is the disease-causing mechanism. Skin testing is necessary.

"Adequate study of autoimmune phenomena in solid tissues will perhaps be possible only when tissue-culture methods are more widely applied to the investigation of disease of unknown cause."

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## CHEMISTRY

# Electric Fields Used To Mix Liquids

► **ELECTRIC FIELDS** can be used to mix liquids in equipment that has no moving parts, W. P. Cropper and H. S. Seelig of the American Oil Company's research and development department in Whiting, Ind., have reported.

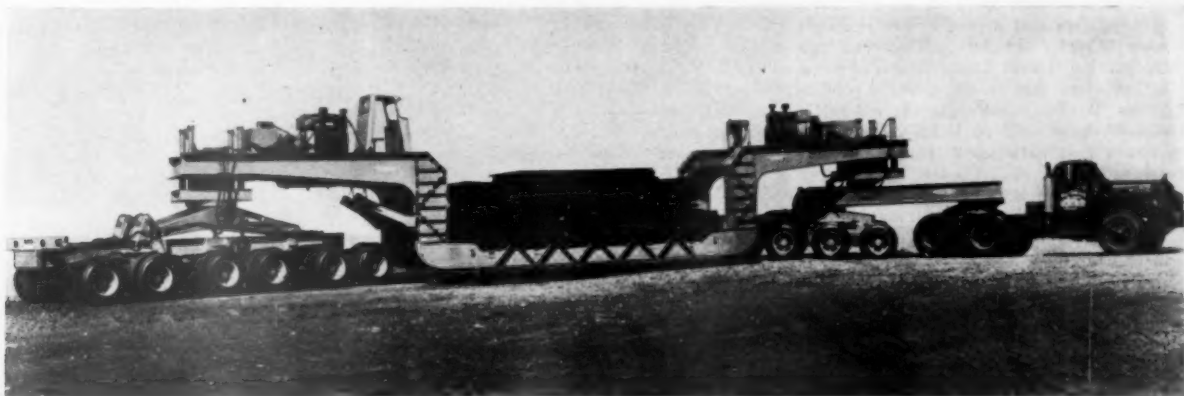
The liquids to be mixed are placed in glass containers between two electrodes and mixing proceeds automatically, they told the joint meeting of the American Institute of Chemical Engineers and the Chemical Engineering Division of the Chemical Institute of Canada in Cleveland, Ohio.

One electrode is liquid mercury placed in the bottom of the container and the other electrode is suspended in the upper liquid layer. Direct current voltages are applied across the electrodes of from 1,000 to 25,000 volts per inch of separation of electrodes.

The bottom layer is usually a solvent such as dimethylformamide, aniline, various esters and various aldehydes. The upper layer is usually a hydrocarbon such as isooctane, a compound found in gasoline. The two layers mix because they are mutually attracted to each other by the opposite charges absorbed from the electrode with which they are in contact. Opposite electrical charges attract. This produces a mixture of two liquids that are not ordinarily miscible.

The advantages of this process is the absence of moving parts and the efficiency of mixing. Power consumption in this method is about the same as in conventional mixing equipment.

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**LARGEST TRUCK TRAILER**—A 40-wheeled vehicle built by Trailmobile, Inc., Birmingham, Ala., carries a test load of more than 110 tons. Telephones keep operators in front and rear tractors in touch with each other.

## PSYCHIATRY

# Mother-Child Psychosis

► ONE INDIVIDUAL can unconsciously force another to act psychotic, Dr. Kenneth H. Gordon Jr., director of the Child Guidance Clinic at Lankenau Hospital, Philadelphia, told the meeting of the American Psychoanalytic Association in Chicago.

This happens, especially, he said, when a mother tries to prolong the extreme closeness of her baby that is natural during the first year of infancy. The mother wants to keep her child a baby instead of letting him live his own life.

As a result, both mother and baby are forced into a double psychosis—what the psychiatrist calls a "folie à deux." As far as society is concerned, when they act psychotic, they are psychotic and usually end up in institutions.

When the child's psychosis is caused by the need of the mother for a psychotic child, the illness is called "false childhood psychosis," Dr. Gordon said. A true childhood psychosis is caused by the need of a child for prolonged infancy that interferes with growing independence during the second year of life.

Much can be done in preventive psychiatry, Dr. Gordon said, by diagnosing the situation early in life and treating the distorted parent-child relationship rather than either mother or baby individually or waiting until they must go to mental hospitals.

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## New Name for Hitler

► TODAY, 16 years after he supposedly committed suicide, and while one of his lieutenants is on trial in Israel for the mass murder of millions of Jews, Adolf Hitler figuratively took his place on a psychoanalyst's couch.

A name, "psychotic character," was coined by Dr. Norbert Bromberg of the Albert Einstein College of Medicine, New York, to describe the peculiar mental state of Hitler as reported to the American Psychoanalytic Association meeting in Chicago.

Hitler was not totally and irreversibly psychotic. Neither could he be considered to be always and in every way relatively normal. Hitler showed such accurate perception and skillful manipulations of political situations that he was called a political genius. But his blind rages, his violent, irrational hates and paranoid ideas would cause a psychiatrist to diagnose him as a psychotic.

Such contradictions in Hitler's psychology caused Dr. Bromberg to call him a borderline case and to give his condition the new name "psychotic character."

The "psychotic character" differs from the true psychotic in ability to establish relations with other people. Hitler, like other psychotic characters, had a relatively poor capacity to get along with others unless he felt he could get something out of them.

The true psychotic may become so in love with himself, so engrossed in his own needs

that they are more important to him than anything or anyone else in the whole world. The psychotic character sometimes temporarily sinks to this level.

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## Child's Promise Is Magic

► WHEN A PARENT insists that his small child "promise to be good," the exacted promise is, to the child, an act of magic, as crying is to the baby, Dr. Herbert J. Schlesinger of the Menninger Foundation, Topeka, Kans., told the American Psychoanalytic Association meeting in Chicago.

Crying, he explained, is originally an expression of the infant's discomfort. Later the baby observes that crying "magically" brings back the parent to his crib. Similarly, the "promise" wins back as if by magic the love or approval of the parents.

The young child is incapable, Dr. Schlesinger said, of truly pledging "to be

good" in a future which he cannot foresee and over which he has little control.

When parents extort a promise to "be good from now on" as the price of avoiding a spanking they build up the childish belief that a promise is "magic."

As the child grows up, Dr. Schlesinger pointed out, the meaning of promising as an act of magic, complete in itself, should give way to an appreciation of promising as a prelude to a later act of keeping the promise.

Maturity in thinking is not, however, always fully achieved and remnants of the childhood magical thinking are to be found in many adults. Among some cultures, as a matter of courtesy, an individual will promise all sorts of things which he has no intention or even capacity to carry out.

When a psychiatrist observed such a pattern of meaningless promising in the history of a mental patient and saw the relationship of the pattern to the behavior of a child not sure of his mother's love, he understood and treated the behavior. Thus the patient matured to become a "man of his word."

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## PSYCHIATRY

# Child Suicide Attempts

► WHEN A CHILD tells his mother spitefully, "You'll be sorry when I'm dead," he is displaying an attitude that may lead him to an actual suicide attempt. Child suicide is not so rare as generally believed.

A study of all patients under 17 entering New York's Bellevue Hospital was reported in Chicago to the American Psychiatric Association by Dr. James M. Toolan, psychiatrist in charge of adolescent services of Bellevue.

Four other major reasons for childhood suicide, besides spite, are:

1. Anger, especially at the parents, is turned inward against self, leading to self-destruction.

2. The suicide attempt is a signal of real distress to call attention to the child's problems in the hope of producing effective help.

3. The suicide attempt is a reaction to a feeling of inner disintegration or is in obedience to the command of an imaginary voice.

4. The suicide attempt is due to a desire to join a dead relative.

The majority of the suicidal children were found to be depressed or maladjusted or to have behavior and character disorders. There has been a tendency to underestimate the importance of depression in young children, Dr. Toolan pointed out, because children have a different manner of showing their depression.

Instead of in "the blues," it often shows in behavior problems in school and at home, in difficulty in concentration, withdrawal, restlessness and boredom. The adolescent, especially, tends to deny that he is depressed and to mask his true feelings with delinquent activity.

Children under ten do not understand the meaning of death as the adult does. They often believe that one can recover from death, it was found.

Of 900 consecutive admissions, Dr. Toolan found, 106 were sent to Bellevue because they had attempted suicide. The youngest was only eight years old. Girls outnumbered boys 85 to 21 in the suicidally disposed group, Dr. Toolan found, but of the 21 children who were under 12 years old, 13 were boys. Among adolescents, 77 were girls and only eight were boys.

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## Mental Patient's Spouse

► AS A MARRIED mental patient recovers, the marital partner often shows signs of mental illness, Dr. Richard N. Kohl of Cornell University Medical College, reported to the meeting of the American Psychiatric Association in Chicago.

During a period of ten years, Dr. Kohl observed 46 such cases of mental illness brought on by the recovery of husband or wife. In all cases, he said, it was necessary to treat the marital partner before the recovery or improvement of the patient could be maintained.

Although both husband and wife deny that marital conflict has anything to do with their mental illness, as the patient gets better, the other partner starts to drink excessively, shows great hostility toward the psychiatrist, threatens divorce or breaks off the patient's treatment.

The success or failure of the treatment often depends on the psychiatrist's ability to deal with the hostility of the marital partner.

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## ANTHROPOLOGY

# Ideas of Power in Africa

► THE IDEAS of power in Africa have been found to be almost exactly opposite those in Western societies.

African societies conceive authority as personal—a person is in authority because he has innate personal powers, Dr. Alvin W. Wolfe of Lafayette College, Easton, Pa., told the Central States Anthropological Society meeting in Columbus, Ohio. In the Western World a man generally has power because of the office he holds.

Dr. Wolfe said that power and responsibility is held in Africa permanently, not just until a term of office ends as is often the case in the West. This is true not just for kings but for anyone in authority.

Authority in Africa is all pervasive. If a person has power, it is not just in one area or field, but in the whole of life and in all he does. In the West, however, a person generally only has authority and power in one field, as a judge in law, a doctor in medicine.

Power is also considered mystical in Africa in contrast to the West, which bases authority and power on rational grounds.

Dr. Wolfe said he has been trying to find common denominators for the way authority is conceived by the many peoples of Africa in order that it may be possible to predict what the future institutions of African nations will be.

Despite the different ways in which au-

thority shows itself from one locality to another, the general conception of it is common over all of Africa, Dr. Wolfe said.

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## Ancient Hawaiians

► HAWAIIANS who lived 500 years ago had a body build very much like that of the modern white American.

The men of this ancient population averaged five feet, seven inches; the women five feet, three inches. They lived in Hawaii 175 to 500 years ago, before Europeans came to the islands.

The stature of these individuals, who had narrow hips and muscular bodies, is also almost identical to the present day population of Hawaii.

Nearly 28% died before maturity, Dr. Charles E. Snow, anthropologist at the University of Kentucky, Lexington, Ky., found from studying 1,200 skeletons of the ancient population. The greatest mortality occurred between the years one and three. The average age of adults at death was about 31 years. The teeth were generally excellent, with only 17% showing decay, Dr. Snow found.

These ancient Hawaiians customarily sat in a squatting position, evidence shows. They appear to have been a very active people. In contrast to historic records, de-

formed skulls were common among them, Dr. Snow reported at the American Association of Physical Anthropologists meeting in Columbus, Ohio.

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## Lean Men Smoke More

► LEAN MEN in a group of 167 Americans of Italian descent were found to smoke more than fat men of the same group.

This was not due to diet, calories, type of food, or intake of alcohol, Dr. Albert Damon of Harvard School of Public Health, Cambridge, Mass., told the American Association of Physical Anthropologists meeting in Columbus, Ohio. He said all of the men had approximately the same diet.

Dr. Damon said the ultimate aim of such tests is to find whether certain kinds of persons smoke more than others. He wants to find out if the size and body type of a person is connected with his smoking and with diseases associated with smoking.

If it can be determined that certain types are more prone to get diseases from smoking, they could be warned ahead of time not to smoke.

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## PLANT PATHOLOGY

## Sequoia Tumors Seen Genetic in Origin

► AN OLD SEQUOIA tree that looks as if it had oddly colored popcorn balls strung along its branches has been found to have a disease that somewhat resembles skin tumor. The popcorn balls are actually tumors and are believed to be of inborn or genetic origin, a theory that, if true, can shed new light on the cancer problem in humans.

The 100-foot tree, growing on the University of California campus in Berkeley, was studied by Dr. C. F. Emanuel of the physiology department.

The tumors, which have a pleasant fragrance, did not grow on the trunk of the tree but almost always grew adjacent to a bud or tiny branch. Their only connection with the tree itself was a slim shaft of woody tissue extending into the heart of the branch.

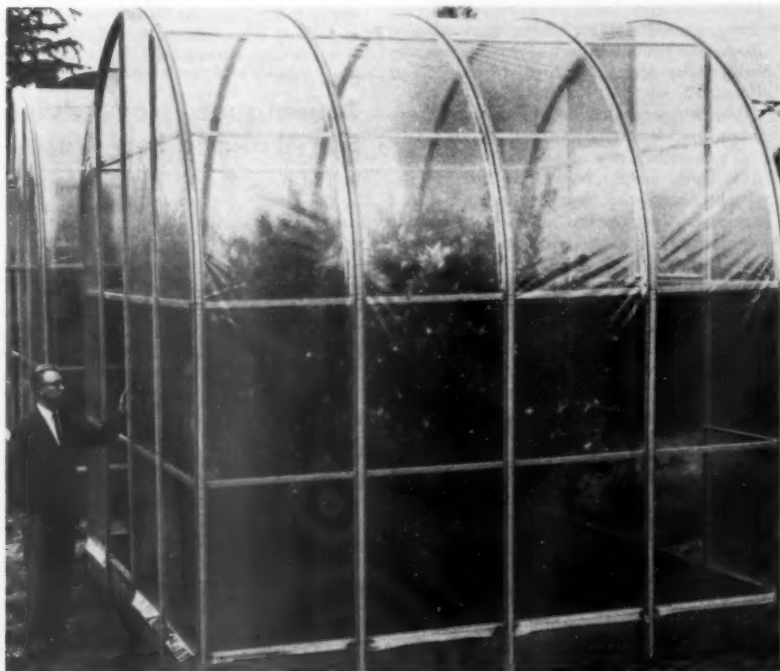
Some of the tumors, Dr. Emanuel reports, were six inches in diameter, nearly half as thick as the main tree trunk. But most of those larger than two inches were dead, probably because the connecting shaft of tissue was pinched closed.

The tumors do not appear to be caused by bacteria or fungus because the branches of nearby trees intermingling with those of the diseased tree had no tumors. In none of the tumors was there any evidence of insect parasites, often the cause of plant galls. Nor would tumor transplants grow inside healthy trees.

The fact that the woody connection for the tumor begins in the pith of the branch, Dr. Emanuel reports in *Science*, 133: 1420, 1961, indicates that this abnormal growth had an early origin from a bud.

Dr. Emanuel is now at the San Juan Research Laboratory, Bellevue, Wash.

• Science News Letter, 79:311 May 20, 1961



**EFFECTS OF SMOG**—Plastic enclosures in a lemon orchard will be used in an attempt to measure the effect smog on citrus trees. The studies at the University of California, Riverside, will compare effects of "natural" and synthetic air pollutants. Dr. C. Ray Thompson, of the air research project, examines the structures.



## SURGERY

## Surgery Still Important For High Blood Pressure

► SINCE 1950 modern drugs have reduced the need for surgery in high blood pressure cases but they have not completely replaced it.

Dr. R. H. Smithwick, surgeon-in-chief of Massachusetts Memorial Hospitals, who developed in 1938 the operation for hypertension most commonly used today, told the Hahnemann symposium on recent advances in hypertension that modern medical therapy "should not be considered a rival of surgical treatment."

If drugs are successful in treating high blood pressure, Dr. Smithwick said, surgery is not indicated.

"However, in the most refractory cases," he said, "surgery, diet and drugs must all be used in an effort to lower the blood pressure levels so that survival rates for this group of cases may be significantly improved."

The common surgical operation, called lumbodorsal splanchnicectomy, was formerly performed in two stages, first on one side of the back and then on the other ten days later. It is now performed on both sides at the same time.

Dr. Smithwick was assisted in his report by Drs. G. P. Whitlaw and D. Kinsey, both of Massachusetts Memorial Hospitals. Hahnemann Medical College and Hospital in Philadelphia sponsored the symposium.

• Science News Letter, 79:312 May 20, 1961

## MEDICINE

## Smaller Doses Effective With New Steroid Drug

► A NEW STEROID drug can be taken in smaller doses and with fewer side effects than other corticosteroids, physicians reported at a symposium in New York.

The drug, called Celestone or betamethasone, is used to treat allergic patients, including those with eye difficulties due to allergy, skin difficulties and rheumatic conditions.

Dr. M. Murray Nierman of the Chicago Medical School reported tests on 353 patients with a variety of skin diseases who showed negligible side effects on short-term administration of the tablets by mouth.

Dr. Arnold H. Gould of Georgetown University School of Medicine and Dr. James Q. Gant Jr. of George Washington University School of Medicine, both of Washington, D. C., tested 154 dermatology patients with no failures.

Results in 150 were good to excellent, they said, and in no case did they find the former dangers associated with steroids. Such dangers include activation of peptic ulcer, hair on the face, buffalo hump or fat pads between the shoulders, moon-shaped face, stretched marks on the abdomen and black and blue marks on the body.

Tests on 39 children with intractable asthma by Dr. Samuel C. Bukantz of the University of Colorado School of Medicine,

Denver, showed almost uniformly good response.

Celestone was first developed some three years ago in the laboratories of the Schering Corporation, Bloomfield, N. J., which sponsored the meeting. Since then clinical trials have been made and the drug has been cleared by the U. S. Food and Drug Administration for sale under doctor's prescription.

Celestone is a synthetic derivative of prednisolone and has the composition 9-alpha-fluoro-16-beta-methyl prednisolone.

• Science News Letter, 79:312 May 20, 1961

## MEDICINE

## Killed Polio Vaccine Tests 98% Effective

► THE PURIFIED and concentrated killed poliovirus vaccine, Purivax, was 98% effective in trials reported in the Journal of the American Medical Association, 176:409, 1961.

The purification process has removed all "serologically detectable monkey-kidney antigen and essentially all other nonviral contaminating materials present in the ordinary crude Salk vaccine."

Drs. Carl Weihl, Cincinnati General Hospital; David Cornfeld, Hospital of the University of Pennsylvania; Harris D. Riley, Children's Memorial Hospital, University of Oklahoma Medical Center; Nancy Huang, St. Christopher's Hospital, Philadelphia; and Henry Cramblett, Wake Forest College, Winston-Salem, N. C., reported findings based on studies of 53 children, mainly infants, who received two doses one month apart. Purivax was developed by Merck Sharp & Dohme, West Point, Pa.

Other reports that will be read by physicians in their official journal:

Tracing the cause of a recent serum hepatitis epidemic in New England to improperly sterilized syringes used on various patients points up the need for disposable equipment or more effective methods of sterilization in the doctor's office.—Dr. H. Bruce Dull, Peter Bent Brigham Hospital, Boston (p. 413).

Safe and unsafe automobile drivers can be discovered through psychological testing. A study of 331 amateur sports car drivers showed that those who committed the most errors reject social customs, lack proper ethical awareness, like to take personal risks and are prone to abstract thought.—Drs. John L. Benton and Lloyd Mills, University of Southern California School of Medicine, Los Angeles; Ken Hartman, space medicine laboratory, Aerojet Corporation, Azusa, Calif.; and James T. Crow, Automotive Editor, Los Angeles (p. 419).

Weight control through self-prescribed formula diets is irrational and no panacea for obesity. Manufacturers of the 60 to 80 types of "complete" formula low calorie diets are "prescribing" the same caloric intake for all persons, which is questionable.—Dr. Philip L. White, secretary, AMA Council on Foods and Nutrition (p. 442).

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# IN SCIENCE

## PHARMACOLOGY

## Non-Narcotic Painkiller Tested on Humans

► A POTENT, non-narcotic painkiller is now being tested in human patients. Taken in pill form, rather than by injection, it is one-half to one-fourth as powerful as morphine, but has none of its addictive powers.

Dr. L. B. Witkin of CIBA Pharmaceutical Products, Summit, N.J., reported to the American Societies for Experimental Biology in Atlantic City, N. J., that 2-amino-indane can deaden pain as well as morphine. Although less potent, he said, it can be given safely in larger doses (25 milligrams as compared with about 15 of morphine).

Unlike morphine, however, 2-amino-indane is a mild stimulant rather than a depressant capable of producing slow respiration, euphoria, dreaminess and addiction.

The chemical was synthesized by Dr. C. F. Huebner, a CIBA chemist. One of its closest chemical relatives is an antihistamine, also found by Dr. Huebner and his co-workers, in the same chemical series.

The new painkiller has been on clinical trial only a few months and data on its use in humans are scant. Its main potential is in the range of pain where a patient needs more than aspirin but does not need to hazard the addictive morphine.

• Science News Letter, 79:312 May 20, 1961

## MEDICINE

## Tourniquets Not Advised For Arm and Leg Wounds

► TOURNIQUETS are "almost never necessary," Dr. R. Arnold Griswold, University of Louisville School of Medicine, Louisville, Ky., told the American Academy of General Practice meeting in Miami Beach, Fla.

Minor arm and leg wounds may be very dangerous, Dr. Griswold said, but elaborate first-aid measures often do more harm than good. The indiscriminate use of a tourniquet can be damaging.

Preventing further contamination and hemorrhage in such wounds can best be achieved by simply applying a "voluminous sterile pressure dressing," he explained.

Dr. Alton Ochsner of the Ochsner Clinic, New Orleans, said that gastric ulcers should be treated by surgery because they may become malignant. Malignancy is impossible to identify in such cases without microscopic examination, he said.

He emphasized that results of surgery are good in 85% to 90% of benign ulcer cases and that most postoperative symptoms develop early and lessen with time. Dr. Ochsner advised prompt management of after-meal distress, nutritional difficulties, recurrent ulceration and other postoperative conditions.

• Science News Letter, 79:312 May 20, 1961



# NE FIELDS

## MEDICINE

### Arteries of Infants Contain Fat Deposits

► **FATTY DEPOSITS** begin to appear in the arteries as early as the first year of life, researchers at the University of London have reported.

Examination of 382 aortas following death showed that every patient in the 11 to 20 age group had fatty deposits and that after 25 particularly, fibrous plaques made their appearance. Complicated lesions appeared in the late 40's and by the late 60's almost all patients were affected with the plaques leading to sclerosis, or hardening of the arteries.

The scientists recommended further studies to find out what factors influenced the conversion of fatty streaks to fibrous plaques in the arteries.

Collaborating in the study, reported in the British Medical Journal, April 29, 1961, were Drs. Kenneth R. Hill, Francis E. Camps, Kathleen Rigg and Brian E. G. McKinney, all of the University of London.

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## MEDICINE

### Two Major Blood Banks Join Forces

► **THE NATION'S** two major blood banking systems—the American National Red Cross and the American Association of Blood Banks—will start exchanging blood and donor replacement credits May 27.

Announcement of the new agreement was made by Gen. Alfred M. Gruenther, American Red Cross president, and Dr. John R. Schenken, American Association of Blood Banks president. Details have been under negotiation since last August when the two organizations first agreed on a nation-wide reciprocity system.

Donors will be able to give blood throughout the United States—through the two organizations' participating banks—and have it credited to a patient anywhere else. In cases involving rare or out-of-stock blood types, blood can be shipped.

Blood and blood credits previously exchanged through separate clearing houses, maintained for many years by the two organizations, will now be exchanged on a national basis through an inter-organizational clearing house.

As an example of how the exchange agreement works, the Red Cross said, suppose a Milwaukee boy is injured in an auto accident in Connecticut. Relatives and friends in Milwaukee give 15 units of blood for him. The blood is kept and used by the AABB bank in Milwaukee. But the credit is forwarded to the Red Cross Regional Center in Connecticut, through the merged clearing house system.

The Connecticut center may then have

occasion to draw blood for a New Englander receiving transfusions at an AABB blood bank in the Midwest. At the end of the month, the exchange of credits may balance the books. If not, an actual exchange of blood may be necessary.

The Red Cross has 55 regional blood centers operating in 1,600 counties in 40 states and the District of Columbia. The AABB has more than 600 community, hospital and private blood banks as members throughout the United States.

Between them, the ARC and the AABB draw, process and deliver about 80% of the 5,000,000 units of blood used for transfusions in the United States each year.

• Science News Letter, 79:313 May 20, 1961

## PSYCHOLOGY

### Human Factors Seen As Arms Control Aid

► **"SCIENTIFICALLY** derived conclusions," based on the predictability of human behavior, can lead the way to effective agreement on arms control and reverse the current trend toward war.

This is the opinion of Herbert K. Weiss, operations research specialist for Ford Motor Company's aeronautronic division, and keynote speaker at the National Symposium on Human Factors in Electronics in Washington, D. C.

Mr. Weiss warned that the present threat of a major war is "intolerably large." Dangers he listed include false signals from early warning networks; accidental nuclear explosions; accidental firing of missiles; faulty intelligence; and sudden acceleration of what starts as a "limited war."

Mr. Weiss said behavior studies should deal with "irrational" causes of war. He believes in "a credible and massive deterrent force," but not one that can be ordered to wage war "on a split-second decision."

He said one possible answer is "increasing the number of people in each country who must concur in the initiation of war," allowing time to prevent hasty and illogical action.

He also endorsed "encouraging military maturity" in nations that recently acquired advanced weapons.

"They may not realize what they have, and how dangerous it is," he said. Possibly we should help them play mock war games, so they'll know just what they can and cannot do."

He said studies of criminal behavior patterns and crime control may lead to solutions for "large-scale control" in world disarmament. Crime trends, he said, show a marked correlation with national likelihood for involvement in war, either as victim or aggressor. Also, they can be studied "less emotionally."

"It is hard to think about the population of the world being annihilated by thermonuclear war in unemotional terms," he added.

Mr. Weiss sees "no simple, obvious solution" to disarmament, but is encouraged by the number of scientists and researchers who are becoming concerned.

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## EDUCATION

### Teaching Machines for Correctional Institution

► **TEACHING MACHINES** will be used to teach basic skills in a correctional institution in Washington, D. C.

The National Institutes of Health has granted the American Institute for Research \$77,000 for a joint program to develop teaching machines geared to teach arithmetic and English to 350 young men between 18 and 26.

The program is designed to determine what advantages teaching machines have over teachers in stimulating these socially maladjusted young men to learn. Many who regard teachers with hostility might be more receptive to machine teaching.

Teaching machines offer information in small steps, followed by a test of that information. At every stage the learner is told whether or not he has answered correctly. The programs will be designed to elicit correct responses in a large percentage of cases.

The satisfaction of being right will likely be reinforced by material rewards at first. Later the material rewards could be withdrawn, as the young men became more interested in the learning process for its own sake.

In addition to building up basic skills, the machines will eventually be used for social education. The institute hopes that teaching machines will thus become an important factor in the rehabilitation of these young men.

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## BIOCHEMISTRY

### New Blood-Clotting Factor Identified

► **A PREVIOUSLY** unknown substance that causes rapid clotting of blood has been found in patients with clots in the veins and arteries of the legs, the International Academy of Pathology was told in Chicago.

Drs. C. A. Pascuzzi, J. A. Spittel, J. H. Thompson and C. A. Owen, all of the Mayo Clinic, Rochester, Minn., reported that the substance, which has been named "thromboplastin generation accelerator," or TGA, seems to be present in small amounts in normal blood. But certain patients have five times the normal amount.

For blood to clot normally, Dr. Pascuzzi explained, thromboplastin, the blood substance that drives the clotting reaction to completion, must be formed. The thromboplastin generation test measures the rate of thromboplastin formation.

Using this test, Dr. Pascuzzi's team found that in seven out of every ten patients with clots in their leg arteries, thromboplastin formation was greatly increased. The same was true for half of the patients with clots in the leg veins.

Some previously unknown factor, namely TGA, must be responsible for this abnormality, Dr. Pascuzzi said, since this phenomenon "could not be identified with any of the known blood clotting substances."

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## BIOCHEMISTRY

# Does Life Exist in Space?

**Bacteria-like cells from meteorites may be a life form from space. Evidence gathered on the moon and planets may tell if life exists in space, Tove Neville reports.**

► **LIFE FORMS** found in "rocks" falling to earth from the skies may tell if there is life elsewhere in space. This is a question scientists have debated for many years.

Organic materials and pre-life forms found in stony meteorites may give a clue to life in space and also reveal how life and the solar system began.

This exciting quest for the knowledge of life as it evolved in the universe has already begun here on earth and will be continued as astronauts break the earth barrier and explore space.

Now Dr. Frederick D. Sisler, a microbiologist of the U.S. Geological Survey, has succeeded in growing bacteria-like cells taken from the Murray meteorite that fell from space in 1950.

In order to rule out the possibility that the meteorite was "contaminated" by earth bacteria from the ground or atmosphere after it fell, Dr. Sisler sterilized it in a solution of hydrogen peroxide and bichloride of mercury and under ultraviolet light.

He then broke open a piece of meteorite and pulverized small amounts of the inside with sterile mortar and pestle in a germ-free laboratory at the National Institutes of Health, Bethesda, Md.

Part of the pulverized material was inserted in test tubes containing a solution of seawater, peptones and sugar. The cells in this solution grew and reproduced themselves in several generations as only living things do.

## Bacteria Can Seep Inside

However, Dr. Sisler told *SCIENCE SERVICE* that bacteria can seep into the inside of the meteorite with water from the outside.

Such bacteria inside a rock or meteorite would stay in an inactive stage, and it might be this kind of cells he has found, Dr. Sisler said. Nevertheless, it is quite possible these particles are from a space source.

To be quite certain living particles found in meteorites actually came from space, satellites could be sent out into space to "catch" a meteor before it became contaminated by the earth's atmosphere.

If a satellite could capture a meteor at about 50 miles altitude (bacteria have been known to exist at 20 to 30 miles) and bring it back to earth in a germ-free condition, it could be examined under sterile conditions on earth and the mystery cleared up, Dr. Sisler suggested.

He also said another way of getting "uncontaminated" meteorites would be to gather them in Antarctica where great falls of meteorites were reported by Admiral Byrd in the 1920's. Bacteria on such meteorites would be inactive—in a state of sus-

pended animation—since they cannot live in Antarctic temperatures.

The meteorite used by Dr. Sisler is a carbonaceous chondrite belonging to a small group of meteorites containing free carbon and sulfur, calcium and magnesium sulfates, and small amounts of organic matter.

Dr. Sisler first examined the Murray meteorite in 1959 with an infrared spectrophotometer (for analyzing the compositions of materials). He became interested in further study when he found in it several organic radicals that occur in living materials, such as amine, nitroso, nitrile and some hydrocarbon.

His findings were checked by Dr. Melvin Calvin of the University of California, both by infrared spectrophotometer and a gas chromatograph (for analyzing the composition of gases).

Dr. Calvin stated that the molecules found in the meteorite are believed by scientists to be part of the evolutionary chain of chemical forms from inert to living materials.

Atoms such as carbon and hydrogen are believed to have been caused to react to

form complex molecules by the energy of cosmic rays, ultraviolet light and electrical storms.

Dr. Calvin said it has been known since the turn of the century that hydrocarbon compounds of the petroleum type exist in stony meteorites. He also said it is reasonable to suppose the compounds inside a meteorite stayed unchanged by the heat generated on the outside of the meteorite as it entered the earth's atmosphere.

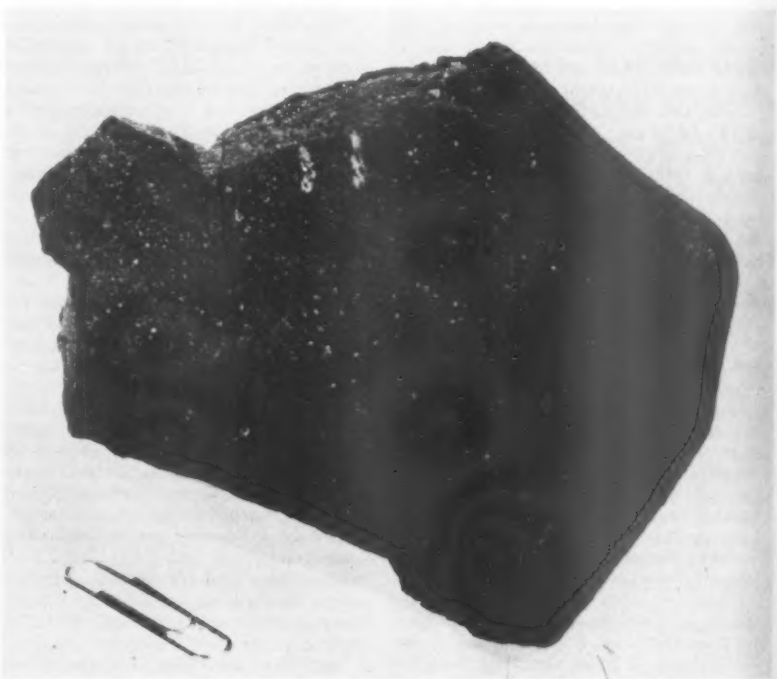
## Hydrocarbons in Meteorites

A fragment of another stony meteorite that fell at Orguël, near Toulouse, France, in 1864, has also recently been examined by scientists and found to contain chemical compounds, including hydrocarbons, akin to those only found in living things on earth.

Also believed to be of space origin but not yet found to contain life are tektites, a form of glass. Recently a scientist found a 500,000-year-old tektite from the Philippines contained the same amounts of nickel and iron as found in a meteorite.

The tektite containing the tiny meteorites was probably formed when a meteor hit the moon and sent out a spray of liquid particles that cooled into a glass. Tektites are thought by some to result from comets or meteors hitting the earth.

Many scientists believe that the process of



**LIFE-CONTAINING METEORITE**—A fragment of the Murray meteorite that contained bacteria-like cells now reproducing themselves in a germ-free laboratory. These cells may be a form of space life.

the creation of life could have taken place on millions of planets traveling around suns (stars) other than our own and that perhaps life is being created all the time. One astronomer has estimated that the known universe could well contain as many as 100,000,000 earth-like planets.

Stars with planets located at such a distance that temperatures are not too hot or too cold might be just as capable of supporting life as is the earth. Other necessary factors for the existence of life are thought to be water and a suitable atmosphere.

The three planets in the solar system believed capable of supporting life are Venus, earth and Mars. However, since no evidence has been found of oxygen on either Venus or Mars, chances are very slim that higher life forms are present there.

Venus, about which very little is known because it is always shrouded in clouds, has been the subject of many conflicting theories. However, although atmosphere of Venus contains water, its surface temperature is estimated to be about 600 degrees Fahrenheit, virtually ruling out any form of life.

The possibility for life on Mars is somewhat better, but only for the lowest forms such as mosses and lichens. Observations of the infrared light reflected from Mars indicate that hydrocarbon-like materials exist

there. Color changes on the planet's surface suggest the possibility of some form of life.

The first experiment to find out if contact could be made with any possible outside intelligent beings was the Project Ozma, named for the queen of the faraway land of Oz in the fairy tale.

Radio astronomers led by Dr. Frank Drake listened to radio signals from deep space, hoping to hear definite patterns that would indicate a system of intelligent communication.

The 85-foot radio telescope at the National Radio Astronomy Observatory, Green Bank, W. Va., was used, but no signals sounding like any kind of a code pattern were heard.

In the past, scientists have reported hearing systematic-sounding radio noises. The inventor Marconi said signals he heard sounded like Morse code. Nikola Tesla reported in 1900 that he had heard signals suggesting "number and order" but was discouraged from publishing any data by public ridicule.

Dr. Drake said the Army has wax records dated of radio noises from space in the 1920's. The study of these records may yield new information about the possibility of life in space.

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#### GENERAL SCIENCE

## China's Science Behind

► DESPITE heavy propaganda alleging rapid progress, science and technology are still in their infancy in Communist China, and "the introduction of a metal plow is considered a scientific achievement and a technological advance."

The report comes from Leo A. Orleans, senior research analyst at the Library of Congress, who spent two years evaluating material on mainland China from Communist and other sources.

The words "science" and "technology" are used so freely by Red China's press and people that "one is just as likely to encounter them in connection with manure collecting and hog raising as with the construction of the much-talked-of atomic reactor," Mr. Orleans said.

The drive to bring "science" down to mass level goes to such absurd lengths as the Kuang-Ming Daily's 1958 description of recruitment efforts for 700,000 farm workers and 300,000 factory, mine and school workers as the building of "a one-million-man army of scientists" in Kiangsi Province.

Aware that China will not reach Western technological levels for many years, the Communists have stressed Chinese accomplishments while down-grading Western progress and influence. A vivid illustration is the fact that physicians trained in Western medicine "have been required to adapt many of the procedures and cures utilized by the old herbists" in traditional Chinese medicine, Mr. Orleans said.

The country's scientific effort is geared to meet immediate technological demands. The few scientists capable of high-level re-

search find it more expedient "to borrow existing knowledge from the more advanced nations and convert it to the special needs and the present level of Chinese technology."

Most of the serious scientific work in China is being conducted in the Chinese Academy of Sciences, Mr. Orleans said. The figures "most frequently encountered" show 170 scientific research institutes attached to the Academy as of 1958—compared with only 31 six years earlier. Total staff (1958) is listed as 28,300, including 5,900 engaged in research. Each institute has a Communist Party branch office whose secretary decides on finances and personnel.

"The rapid growth in the Academy's personnel has been concentrated in the total staff and not in the research personnel," Mr. Orleans noted.

He said the Chinese "rely heavily on their cooperation with the Soviet Union" in scientific and technological matters, but "hope gradually to decrease their dependence."

Generally, Communists are raising the educational base of the Chinese masses, and have made impressive progress toward increased industrial productivity, Mr. Orleans found.

His report is contained in the book, Professional Manpower and Education in Communist China, released by the National Science Foundation. (Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) (See p. 316)

• Science News Letter, 79:315 May 20, 1961

#### TECHNOLOGY

## Shakespeare's Words Spoken by Computer

► SHAKESPEARE'S WORDS have been spoken by a computer. The machine also sang a song. It was all done electronically.

The synthetic speech was produced by instructing the computer to change the symbols for sounds, corresponding to the quotation from Shakespeare, into the audible sounds of speech.

The "talking" computer will say only what it is instructed to say by means of punched cards. The recitation and music were produced at the Bell Telephone Laboratories, Murray Hill, N. J.

Development of the artificial talker was reported to the Acoustical Society of America meeting in Philadelphia by Drs. John L. Kelly Jr. and Louis J. Gerstman.

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#### VIROLOGY

## Spherules in Liver Cells Thought Hepatitis Virus

► A VIROLOGIST in Nigeria believes he has visible evidence to support the theory that infectious hepatitis is caused by a virus. The cause of hepatitis is a medical mystery.

Dr. W. G. C. Bearcroft of the West African Council for Medical Research in Yaba, Lagos, Nigeria, found, with the help of an electron microscope, spherical bodies that are larger than any seen previously in infectious hepatitis cells. They are not found in normal persons.

These bodies, Dr. Bearcroft reported in *Nature*, 190:541, 1961, may be the causative virus.

Usually, he said, they are confined inside the liver cells, but occasionally they appear to be passing from the cells into the spaces that lead to the liver veins and are present in the blood serum.

• Science News Letter, 79:315 May 20, 1961

#### PHOTOGRAPHY

## 8mm Sound Film Picture Industry Boon

► EIGHT-MILLIMETER sound film is expected to extend the motion picture industry much as paper-bound books have enlarged the publishing field, the Society of Motion Picture and Television Engineers was told in Toronto, Canada.

John Flory, Eastman Kodak Company, Rochester, N. Y., predicted that by the year 1976 there will be 15,500,000 8mm sound-on-film projectors in use throughout the world.

An estimated total of 727,000 16mm sound projectors are now in use in the United States, whereas almost 4,000,000 8mm silent projectors are estimated to be in use in the United States.

Mr. Flory said every family in the U. S. with an income of more than \$5,000 per year should be a potential prospect for 8mm sound equipment.

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# Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

**ACOUSTIC PROPAGATION AND ISOLATION: A Summary of Elastic, Viscoelastic and Acoustic Isolation Properties of Materials**—F. E. Bellas—*Pa. State Univ., College of Engineering*, 51 p., paper, \$2.

**ADVANCES IN CRYOGENIC ENGINEERING**, Vol. 6—K. D. Timmerhaus, Ed.—*Plenum Press*, 622 p., illus., \$15. Proceedings of the Sixth National Conference held in August, 1960, at the University of Colorado's College of Engineering, at Boulder, with the National Bureau of Standards as co-host.

**ALTERNATING-CURRENT MACHINES**—Michael Liwischitz-Garik and Clyde C. Whipple—*Van Nostrand*, 2nd ed., 604 p., illus., \$15. Comprehensive and detailed undergraduate text for students in Electrical Engineering.

**AUDUBON AND HIS JOURNALS**, Vols. I and II—Maria R. Audubon, with zoological and other notes by Willott Coues—*Dover*, 532 p., 554 p., illus., paper, \$2 each. Unabridged republication of first edition published in 1897.

**BEASTS OF THE TAR PITS: Tales of Ancient America**—W. W. Robinson—*Anderson & Ritchie*, rev. ed., 48 p., illus. by Irene B. Robinson, \$2.50. Recreates for boys and girls the prehistoric animals whose bones and skulls were uncovered by scientists in the tar pits in

Hancock Park on Wilshire Boulevard in Los Angeles.

**BIOGRAPHICAL MEMOIRS**, Vol. XXXV—Lester R. Dragstedt and others—*Columbia Univ. Press* for the National Academy of Sciences, 383 p., illus., \$5. Biographies of recently deceased members of the Academy with bibliographies of their works.

**CALIBAN'S PROBLEM BOOK: Mathematical, Inferential and Cryptographic Puzzles**—Hubert Phillips ("Caliban"), S. T. Shovelton and G. Struan Marshall—*Dover*, 180 p., paper, \$1.25. Unabridged reprint of 1933 edition.

**CATARACT AND GLAUCOMA: Hope Through Research**—National Institute of Neurological Diseases and Blindness, NIH—PHS, 16 p., illus., paper, single copies free upon request direct from Public Health Service, Washington 25, D. C. Information for the layman.

**CHINESE MAINLAND SCIENCE AND TECHNOLOGY: OTS Selective Bibliography**—Office of Technical Services—OTS, 21 p., paper, 10¢ direct to OTS, U. S. Dept. of Commerce, Washington 25, D. C. Bibliography of translated abstracts from Communist Chinese scientific and technical journals. See also Chinese Supplement, SNL Dec. 10, 1960.

**THE COMPLETE SCIENTIST: An Enquiry into the Problem of Achieving Breadth in Education at School and University of Scientists, Engineers and Other Technologists**—Lever-Hulme Study Group, Sir Patrick Linstead, Dir.; preface by Sir George Thomson—*Oxford Univ. Press*, 162 p., \$2.90. Report to the British Association for the Advancement of Science.

**CYBERNETICS WITHOUT MATHEMATICS**—Henryk Greniewski, transl. from Polish by Olgierd Wojtasiewicz—*Pergamon*, 201 p., \$6. Presents the foundations of cybernetics as outlined at the First International Cybernetical Congress at Namur in 1956.

**ELEMENTARY EDUCATION and the Academically Talented Pupil**—David C. Sanders—*NEA*, 96 p., paper, \$1. Discusses the ways in which to meet the needs of the gifted pupil within the elementary-school program.

**ELEMENTS OF BIOLOGY**—Paul B. Weisz—*McGraw*, 491 p., illus., \$6.75. Beginning course in biology, analytical rather than merely descriptive, attempts to teach student to think about living process "from the molecule-up."

**ELEMENTS OF ZOOLOGY**—Tracy I. Storer and Robert L. Usinger—*McGraw*, 2nd ed., 464 p., illus., \$7.25. Authors' updated abridgement of their *General Zoology*, for courses requiring a shorter text.

**THE ENCYCLOPEDIA OF MICROSCOPY**—George

L. Clark, Ed.—*Reinhold*, 693 p., illus., \$25. International authorities cover, alphabetically arranged, 26 kinds of microscopy, from autoradiography to X-ray microscopy. This reference work offers up-to-date information on the biological, medical, pharmaceutical, forensic, chemical, engineering and industrial applications of microscopy.

**EVERYMAN'S CONCISE ENCYCLOPEDIA OF RUSSIA**—S. V. Utechin—*Dutton*, 623 p., photographs, \$7.95. In alphabetical order lists some 2,050 articles on every aspect of Russian life, including biographies, topography, population, science and technology.

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**FUNDAMENTALS OF SOLID ROCKET PROPULSION**—Henry Tao-Sze Hsia—*Lockheed Missiles & Space Div. (OTS)*, 47 p., paper, \$1.25. Review of solid rocket propulsion for non-specialists.

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**THE INDIANS OF TEXAS: From Prehistoric to Modern Times**—W. W. Newcomb, Jr.—*Univ. of Texas Press*, 404 p., illus. by Hal M. Story, \$5.75. Anthropologist's re-creation from scattered data of all aspects of Indian existence within the present borders of the state.

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## INVENTIONS

# Patents of the Week

The first nuclear reactor for merchant marine vessels has been patented. A process for preserving vegetable juices and a "washer" that cleans with sound waves are other inventions.

► **THE STREAMLINED** United States merchant marine fleet of the future will probably be powered by an atomic reactor just patented.

It is the first nuclear reactor designed for merchant marine vessels and has been installed in the Savannah, which is also the first atomic-powered merchant marine ship. Atomic-powered merchant ships will be able to drop anchor in many ports without refueling for many years. This atomic reactor can operate for more than three years without refueling, or an equivalent of 355,000 nautical miles.

The reactor received patent No. 2,982,713 and rights were assigned to the Atomic Energy Commission. The five inventors, awarded the patent, work in the atomic energy division of Babcock & Wilcox Company, Lynchburg, Va. They are Melvin F. Sankovich, John F. Mumm, Donald C. North Jr., Harvey R. Rock, and Donald K. Gestson, of Lynchburg. Babcock & Wilcox Company built and designed the entire propulsion unit in the Savannah, which is currently undergoing intensive testing before being launched at the end of this summer.

The reactor is compact, yet safe. The power comes from rod-shaped fuel elements stacked in a cylindrical core, and the reactor is cooled by circulating water.

Vegetable juices such as tomato and carrot can last much longer at room or refrigerated temperatures if they are processed by the method specified in patent No. 2,982,657, inventor Fritz-Gunther Keitel of Hamburg, Germany, claims. Normally, vegetable juices lose their flavor and spoil quickly due to the action of unwanted bacteria suspended in the juices. This action is supposedly stopped cold by fermenting the juice at high temperatures in the presence of lactic acid and then pasteurizing the juice. (Lactic acid is the material in sour milk that gives an unpleasant taste.)

A high-speed "washer" that cleans soiled articles with sound waves won patent No. 2,982,524 for Marshall R. Bland of La Habra, Calif. Patent rights were assigned to Purex Corporation. Two propellers with wedge-shaped tips both generate sound waves and swirl the cleaning liquid around the dirty articles, releasing the grime and grease.

A portable prefabricated shelter (patent No. 2,982,290) for use in the Arctic and other cold regions was patented by Walter Rudolf Hunziker of Atlanta, Ga. The igloo-shaped shelter consists of plastic-glass fiber panels hinged together. The panels fold up like an accordion when not in use and can be readily carried from one location to another.

A device that helps control the flow of

blood from a donor, claimed to have little discomfort for the patient, was patented by Edward Sohler Welch Jr., of Framingham, Mass. The rights of patent No. 2,982,286 were assigned to Baxter Laboratories, Inc., of Morton Grove, Ill.

The blood flows from the vein into a depressurized container until it is automatically stopped by the device when the blood reaches a certain level in the container. The container is then shaken to mix the blood with a preservative, injected into the chamber, for storage in a blood bank.

• Science News Letter, 79:318 May 20, 1961

## GENERAL SCIENCE

## Industry's "Left-Overs" Help Young Scientists

► **ODDS AND ENDS** from the supply rooms of an electric company go into its "Operation Grab Bag," designed to help teen-aged scientists to build their own ingenious computers and communications systems.

This program, started two years ago by the Automatic Electric Company of Northdale, Ill., was designed to offer used and obsolete telephone and electronic equipment to science teachers and science-minded high school and college students in the immediate area. The company hoped to stimulate interest in science and to help those in schools, science clubs and science fair groups learn more about modern electronics and communications.

Widespread response resulted in expansion of the Grab Bag program that has been supplying electro-mechanical components to schools for use as teaching aids and to individual students across the country. Such equipment has turned up as essential parts of science projects that have won top honors and national recognition.

For example, a dozen or more pieces of equipment from the Grab Bag helped David Peterson of Delphi, Ind., earn a place in the Honors Group of the 20th Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted by SCIENCE SERVICE. The 17-year-old high school senior constructed a unique dial telephone system to control electrical equipment.

Other companies are helping student-scientists and science teachers by coming to the rescue with special parts, instruction in techniques, access to literature and use of testing equipment.

In San Jose, Calif., "Operation Junk," a popular annual feature of the science club clinic, offers large quantities of industrial throw-away materials to the high school clubs.

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## PUBLIC SAFETY

# Hazards to Be Labeled

▶ **WHEN YOU SEE "Poison"** on a bottle of turpentine you buy a few weeks hence, it means that Uncle Sam will be trying to save the lives of little children. Manufacturers of household aids such as waxes, cleaning agents, bleaches, detergents, wood finishes and their solvents face enforcement of labeling laws Aug. 1 unless they can prove certain products are not hazardous.

The Food and Drug Administration published the first proposed regulations for enforcement of the new law in the Federal Register, April 29, 1961.

A public hearing will be held some time in July, FDA said, and interested persons may present their views on or before June 28 in writing to the Hearing Clerk, Department of Health, Education and Welfare, 330 Independence Ave., S.W., Washington 25, D. C.

Such common substances as kerosene and turpentine must carry the words "Danger—Poison" on their labels.

Special precautionary labeling must in-

clude the usual or chemical name of the hazardous substance or of each component that contributes significantly to the hazard. Plain labeling in conspicuous type is required.

"Keep out of the reach of children" and instructions for handling and storage of hazardous packages are among the precautionary measures proposed. Instruction for first-aid treatment is required if necessary.

Proposed for special designation as "strong sensitizers" requiring warning or caution labeling are the antiseptic formaldehyde; powdered orris root, used as a dusting powder; oil of bergamot, used for masking disagreeable odors; and certain glues.

Food, drugs and cosmetics already under the Federal Food, Drug and Cosmetic Act and "economic poisons" covered by the Federal Insecticide, Fungicide and Rodenticide Act are exempt from the new regulations.

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## PSYCHIATRY

# Hypnosis Aids Research

▶ **HYPNOSIS** was successfully used in a study of changes in body chemistry when individuals were suffering from anxiety, Dr. Harold Persky of the Institute of Psychiatric Research in Indianapolis, Ind., reported to the meeting of the New York Academy of Sciences.

The anxiety was produced in perfectly normal humans by first placing them in a hypnotic trance and then suggesting the anxiety to them by having them listen to a message recorded on a tape. The tape was used in order to make the suggestion the same to all those taking part in the experiment.

The hormones hydrocortisone and corticotropin are secreted in significantly elevated quantities during anxiety, Dr. Persky found. This body chemistry effect was increased during the experiment by the injection of the hormones until the level was 10 to 20 times that occurring naturally. The level of anxiety was measured with standardized tests.

By determining exactly what are the chemical accompaniments of anxiety, it is hoped that an effective treatment to relieve anxiety can be developed.

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## Drugs During Growth

▶ **PSYCHOLOGICAL DEVELOPMENT** is relatively resistant to change by drugs that affect the mind, Dr. J. L. Fuller of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., told the meeting of the New York Academy of Sciences.

Dr. Fuller's conclusion is based on experiments with dogs growing under rigor-

ously controlled conditions for a period of three years. The animals were treated with chlorpromazine (a tranquilizer), mescaline (from a plant used by Indians as an intoxicant during ceremonies) and amphetamine (used to relieve depression).

Although these drugs did not seem to cause any permanent changes in psychological and behavioral development, transitory effects were noted. Dr. Fuller is continuing with a study of such temporary chemical imbalance during the period of basic perceptual learning to determine whether it might later cause disturbed behavior in adults.

Such a hypothesis seems reasonable, he said, as applied to findings in disorders such as schizophrenia.

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## Questions

**ASTRONAUTICS**—How long in time and mileage was the first U. S. space trip? p. 307.

**PSYCHIATRY**—What does the name "psychotic character" given to Hitler mean? p. 310.

Photographs: Cover, pp. 306 and 307 National Aeronautics and Space Administration; p. 309, Trailmobile, Inc.; p. 311, University of California; p. 314, Ruby Barnhard; p. 320, Bretford Mfg. Co.

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shown in the photograph, stands 40 inches high and has capacity enough to prepare a 15-pound roast or turkey. It can be converted for charcoal grilling.

• Science News Letter, 79:320 May 20, 1961

• **HOME GYMNASIUM** of aluminum weighs only 39 pounds and also serves as a rest table. It can be adjusted to more than

500 positions for relaxation in elevated, arched or horizontal postures. Such positions, through gravity, are intended to improve circulation while overcoming fatigue. It also provides support for push-ups and other exercise.

• Science News Letter, 79:320 May 20, 1961

• **DOUBLE-FACED TAPE** that is sticky on both sides binds two surfaces together. Housed in a convenient dispenser, the tape replaces liquid glue in many instances and can be used to mount photographs or stamps and splice pieces of paper.

• Science News Letter, 79:320 May 20, 1961

• **STREAMLINED BICYCLE** is constructed of glass fiber and plastic. The glass fiber forms actual load-bearing frame and connection structure. All mechanical parts are enclosed to prevent rusting, and chain hazards are eliminated. The bicycle is lightweight but strong and durable.

• Science News Letter, 79:320 May 20, 1961

• **MOVIE CAMERA** has reflex electric eye that sees only what the lens sees. It is not affected by light outside the field of view. The new 8 mm camera also has through-the-lens viewfinding and focusing. Its electric-powered zoom lens has two speeds. Roll-film and magazine-load models are available.

• Science News Letter, 79:320 May 20, 1961



## Nature Ramblings



## Do You Know?

► **SNAILS**, the quaint and curious creatures that carry their houses on their backs, have been objects of interest to generations of children and their elders as well.

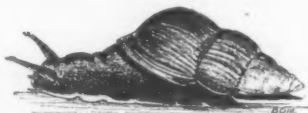
"Slow as a snail" is proverbial, but in justice, "patient as a snail" should be added, for these leisurely travelers can make surprisingly long journeys if given enough time.

Snails are molluscs, a zoological phylum that includes such diverse creatures as oysters, clams, cuttlefish, rock limpets and chitons. They are classified as gastropods, which means stomach-foot because the broad, flat muscular pad, or foot, on which it moves is the most prominent thing about the lower part of the snail's body.

Plastered firmly on the rock or plant stem, the snail progresses by a succession of rhythmic waves in this foot. The waves start at the rear and slowly push through to the front, and each wave sets the snail forward a fraction of an inch.

One of the most intriguing aspects of the

### Snails



snail is its stalked eyes, which are quickly pulled back into the body when touched. These eyes are very primitive in structure and are believed to do little more than distinguish light from darkness and detect motion in nearby bodies.

Some snails have a little oval trapdoor on the upper rear side of their bodies. It fits the opening of their shells so exactly that when they withdraw into their houses for safety, the trap door serves as an extra barricade.

For some reason, most snail shells coil to the right, but a few coil to the left, as in the illustration above.

• Science News Letter, 79:320 May 20, 1961

The price of water in the United States ranges from \$50 to \$300 for every million gallons.

Some viruses remain harmless in human tissue for many years, and then suddenly become actively dangerous.

California produces about one-third of the apricots grown in the world.

Seasickness in violent weather is one of the chief menaces to survival at sea after a shipwreck, trials by British authorities in the Atlantic during the past winter have shown.

Nuclear submarines can now operate routinely under the polar ice with sonar and other electronic aids providing ability to avoid downward projecting ice formations and icebergs in open water.

• Science News Letter, 79:320 May 20, 1961





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